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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/620,404	07/16/2003	James M. Ntambi	960296.99128	2922

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EXAMINER
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HOLT, ANDRIAE M

ART UNIT	PAPER NUMBER
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1616

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>		<b>Applicant(s)</b>	
	10/620,404		NTAMBI ET AL.	
	<b>Examiner</b>		<b>Art Unit</b>	
	Andriae M. Holt		1616	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 17 December 2010.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 6-11 is/are pending in the application.
- 4a) Of the above claim(s) 6 and 8-11 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

This Office Action is in response to Applicant's request for reconsideration filed December 17, 2010. Claims 6-11 are pending in the application. Claims 6 and 8-11 are withdrawn to a nonelected invention and species. Claim 7 will presently be examined to the extent they read on the elected subject matter of record.

#### ***Status of Claims***

The rejection of claim 7 under 35 U.S.C. 103(a) as being unpatentable over Crooke et al. (US 7,132,529) in view of Hayden et al. (US 2003/0157552) in further view of Ntambi Publication (1999) **is maintained**.

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Crooke et al. (US 7,132,529) in view of Hayden et al. (US 2003/0157552) in further view of Ntambi Publication (1999).

#### ***Applicant's Invention***

Applicant claims a method of increasing insulin sensitivity by administering an agent for reducing stearoyl-CoA desaturase 1 activity to increase insulin sensitivity and then measuring insulin sensitivity and observing an increase in insulin sensitivity

following a reduction in SCD1 activity. Applicant further claims the agent is an antisense oligonucleotide for SCD1.

***Determination of the scope of the content of the prior art***  
**(MPEP 2141.01)**

Crooke et al. teach a method of inhibiting the expression of human SCD comprising contacting the cells or tissues in vitro with an antisense oligonucleotide (claim 10). Crooke et al. teach that stearyl-CoA desaturase affects the ratio of stearate to oleate which, in turn, affects cell membrane fluidity. Crooke et al. teach that alterations of this ratio have been implicated in various disease states including non-insulin-dependent diabetes mellitus and obesity (col. 2, lines 1-5). Crooke et al. further teach antisense oligonucleotides as capable of modulating the expression of SCD (col. 3, lines 24-39). Crooke et al. teach that the overall effect of interference with target nucleic acid function is modulation of the expression of stearyl-CoA desaturase. In the context of the invention taught by Crooke et al, "modulation" means either an increase (stimulation) or a decrease (inhibition) in the expression of the gene (col. 4, lines 1-7). As a result of the antisense oligonucleotide of Crooke et al. inhibiting the expression of SCD, the antisense oligonucleotide inherently increases insulin sensitivity by reducing SCD protein level. Crooke et al. teach the specificity and sensitivity of antisense are also harnessed by those of skill in the art for therapeutic uses. Antisense oligonucleotides have been employed as therapeutic moieties in the treatment of disease states in animals and man (col. 6, lines 60-64). Crooke et al. teach the antisense compounds of the present invention can be utilized for diagnostics,

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therapeutics, prophylaxis, and as research reagents and kits. For therapeutics, an animal, preferably a human, suspected of having a disease or disorder which can be treated by modulating the expression of stearoyl-CoA desaturase is treated by administering antisense compounds (col. 14, lines 44-56). Crooke et al. teach the antisense compounds of the invention are useful for research and diagnostics, because these compounds hybridize to nucleic acids encoding stearoyl-CoA desaturase, enabling sandwich and other assays to easily be constructed to exploit this fact (col. 14, lines 58-63). Crooke et al. teach kits using such detection means for detecting the level of stearoyl-CoA desaturase in a sample may also be prepared (col. 14, lined 67-col. 15, lines 1-2). Crooke et al. teach in example 5, col. 37, lines 35-67-col. 38, lines 1-33, the preparation of a 20-residue, phosphorothioate-linked chimeric oligonucleotides comprising 10-residue DNA core surrounded by 5-residue 2'-O-methoxyethylribosides "wings" (elected species). Crooke et al. teach in example 10 antisense modulation of stearoyl-CoA desaturase expression can be assayed in a variety of ways known in the art (col. 41, lines 51-52). Crooke et al. teach protein levels of stearoyl-CoA desaturase can be quantitated in a variety of ways well known in the art, such as immunoprecipitation, Western blot analysis (immunoblotting), ELISA or fluorescence-activated cell sorting (FACS) (col. 42, lines 3-6).

**Ascertainment of the difference between the prior art and the claims  
(MPEP 2141.02)**

Crooke et al. do not teach that the antisense oligonucleotide for SCD1 specifically increases insulin sensitivity or the measurement of the insulin sensitivity. It is for this reason Ntambi and Hayden et al. are added as secondary references.

Hayden et al. teach the use of screening assays based on the role of human stearoyl-CoA desaturase 1 in human diseases, disorders or conditions relating to serum levels of triglycerides, VLDL, HDL, LDL, total cholesterol, or production of secretions from mucous membranes (Abstract). Hayden et al. teach that the physiological benefits of an increase or decrease in the activity or expression of SCD1 include therapeutic benefit in Type II diabetes. The determination of the ability of agents to modulate such activity or expression affords an opportunity to discover useful therapeutic agents producing such effects (page 13, paragraph 171). Hayden et al. teach in claim 48 a method of treating diabetes and insulin resistance in an individual comprising the steps of administering to that individual an inhibitor of an SCD1 protein expression or activity.

The Ntambi Publication (Ntambi) teaches that the lipid composition of cellular membranes is regulated to maintain membrane fluidity. A key enzyme involved in this process is the membrane-bound stearoyl-CoA desaturase (SCD) which is the rate-limiting enzyme in the cellular synthesis of monounsaturated fatty acids from saturated fatty acids. Ntambi teaches alterations in this ratio have been implicated in various disease states including obesity and non-insulin-dependent diabetes mellitus. Ntambi teaches the regulation of stearoyl-CoA desaturase is therefore of considerable physiological importance and its activity is sensitive to dietary changes, hormonal imbalance, developmental processes, temperature changes, metals, alcohols, peroxisomal proliferators and phenolic compounds (Abstract). SCD was viewed as a lipogenic enzyme not only for its key role in the biosynthesis of monounsaturated fatty acids but also for its pattern of regulation by diet and insulin. SCD activity was

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decreased in rat liver during starvation and diabetes and was rapidly induced to high levels upon refeeding high carbohydrate diets or upon insulin administration (page 1550, col. 2, Influence of Dietary Fat on Stearoyl-CoA Desaturase in Disease States). SCD activity has also been shown to be elevated in the adipose tissue of various animal models of obesity and a positive correlation between SCD activity in skeletal muscle and the percentage of body weight has been reported in human subjects. In type II diabetes, SCD levels are increased, presumably in response to increased levels of plasma insulin (page 1551, col. 1, paragraph 2).

***Finding a prima facie obviousness***  
***Rationale and Motivation (MPEP 2142-2143)***

It would have been obvious to one of ordinary skill in the art at the time of invention to combine the teachings of the Crooke et al., Hayden et al., and Ntambi and use the antisense oligonucleotide for SCD1 to increase insulin sensitivity and measure the insulin sensitivity and observe an increase in insulin sensitivity. Crooke et al. teach antisense oligonucleotide compounds are capable of inhibiting the expression of human SCD by contacting the cells or tissues with an antisense oligonucleotide and that SCD has been implicated in various diseases including diabetes. One skilled in the art at the time the invention was made would have been motivated to use an antisense oligonucleotide to reduce stearoyl-CoA desaturase activity to increase insulin sensitivity because Hayden et al. teach a method of treating diabetes and insulin resistance in an individual by administering to that individual an inhibitor of SCD1 protein expression activity. Therefore, it would have been obvious to the skilled artisan that an antisense

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oligonucleotide that inhibits SCD1 would be able to treat insulin resistance, which would in turn increase insulin sensitivity. In addition, Ntambi teaches that SCD is viewed as a lipogenic enzyme because of its pattern of regulation by diet and insulin. The fact that SCD activity was decreased in rat liver during starvation and diabetes and was rapidly induced to high levels upon refeeding high carbohydrate diets or upon insulin administration and that in type II diabetes, SCD levels are increased, presumably in response to increased levels of plasma insulin indicates that there is a relation between the level of SCD1 and the amount of insulin present in a subject. In reference to measuring insulin sensitivity and observing an increase in insulin sensitivity, it would have been obvious to the skilled artisan that a person who is being treated for diabetes would have to test their blood sugar levels after administration of the agent that reduces the SCD1 activity. It is known in the art that a person being treated for diabetes has to determine insulin sensitivity levels prior to and after the administration of a medication to determine if the medication is effective. A drop in blood glucose levels would indicate that insulin resistance is decreasing and insulin sensitivity is increasing.

Therefore, the claimed invention as a whole would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made because every element of the invention has been fairly suggested by the cited reference.

### ***Response to Arguments***

Applicant's arguments filed December 17, 2010 have been fully considered but they are not persuasive. Applicant argues a combination of Crooke, Hayden, and Ntambi would not have made the invention obvious to the skilled artisan because the

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combination fails to teach or suggest the claimed method steps. Applicant argues that Crooke fails to teach or suggest any causal relation between decreasing SCD1 activity by administering antisense to a subject and increasing insulin sensitivity in the subject. Applicant argues that the examiner used impermissible hindsight to allege that a skilled artisan would have recognized a causal relation between SCD1 and diabetes. Applicant further argues that neither Hayden nor Ntambi teach or suggest the step of measuring increased insulin sensitivity. In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). Crooke et al. teach antisense oligonucleotide compounds are capable of inhibiting the expression of human SCD by contacting the cells or tissues with an antisense oligonucleotide and that SCD has been implicated in various diseases including diabetes. The indication by the background teaching of Crooke et al. that SCD has been implicated in various diseases including diabetes would indicate to the skilled artisan that there is a causal relationship between SCD1 and diabetes. As indicated in the previous rejection, Crooke et al. do not specifically disclose that the antisense oligonucleotide for SCD1 increases insulin sensitivity or the measurement of the insulin sensitivity. It is for this reason Ntambi and Hayden et al. were added as secondary

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references. The skilled artisan would have been motivated to use an antisense oligonucleotide to reduce stearyl-CoA desaturase activity to increase insulin sensitivity because Hayden et al. teach a method of treating diabetes and insulin resistance in an individual by administering to that individual an inhibitor of SCD1 protein expression activity. Therefore, it would have been obvious to the skilled artisan that an antisense oligonucleotide that inhibits SCD1 would be able to treat insulin resistance, which would in turn increase insulin sensitivity. In addition, Ntambi teaches that SCD is viewed as a lipogenic enzyme because of its pattern of regulation by diet and insulin. The fact that SCD activity was decreased in rat liver during starvation and diabetes and was rapidly induced to high levels upon refeeding high carbohydrate diets or upon insulin administration and that in type II diabetes, SCD levels are increased, presumably in response to increased levels of plasma insulin indicates that there is a relation between the level of SCD1 and the amount of insulin present in a subject. While the method step of measuring insulin sensitivity and observing an increase in insulin sensitivity is not specifically disclosed in the prior art, it would have been obvious to the skilled artisan that a person who is being treated for diabetes would have to test their blood sugar levels after administration of the agent that reduces the SCD1 activity. It is known in the art that a person being treated for diabetes has to determine insulin sensitivity levels prior to and after the administration of a medication to determine if the medication is effective. A drop in blood glucose levels would indicate that insulin resistance is decreasing and insulin sensitivity is increasing.

***Response to Declaration***

The declaration filed December 17, 2010, is insufficient to overcome the rejection of claim 7 based upon 35 U.S.C. 103(a) as set forth in the Office action because of the following reason: it is unclear based on paragraph 2 of the Declaration under whose supervision the experiment was conducted. James M. Ntambi, inventor of the current application, has signed the declaration. However, Katherine Berns Von Donk Steenbock has provided background information, including a statement that a copy of her Curriculum Vitae is attached as Exhibit A. Exhibit A is actually an attachment of the Curriculum Vitae of James M. Ntambi. Paragraphs 3-5 of the Declaration indicate that the Office Action has been reviewed and that the Declaration is being submitted to provide evidence that the pertinent subject matter of Hayden was not disclosed by Hayden before the invention by the instant Applicants for patent. The examiner cannot determine if the statements are provided by Dr. Steenbock or Dr. Ntambi. If the statements are provided by Dr. Ntambi, it is unclear to the examiner the purpose of Dr. Steenbock's statement, as Dr. Steenbock is not named as a co-inventor on either the Hayden reference (US 2003/0157552) or the current application under examination. As such, the declaration cannot be used to overcome the obviousness rejection of the instant application to disqualify the reference as prior art.

The claims remain rejected.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andriae M. Holt whose telephone number is 571-272-9328. The examiner can normally be reached on 7:00 am-4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richter Johann can be reached on 571-272-0646. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Andriae M. Holt  
Patent Examiner  
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